

# Prevalence of Thyroid Dysfunction in Newly Diagnosed Metabolic Syndrome Patients, Nizamabad

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## ABSTRACT

### BACKGROUND

Metabolic Syndrome (MS) is a cluster of metabolic abnormalities wherein patients are obese and have hypertension, high triglyceride level, low high density lipoprotein, and abnormal fasting glucose levels.<sup>1,2</sup> It is also known as Syndrome X. Metabolic syndrome is associated with the risk of developing cardiovascular disease and type 2 diabetes. The main objective of this study was to determine the prevalence of thyroid dysfunction among newly diagnosed metabolic syndrome patients.

### METHODS

The study was conducted among patients attending the OPD of General Medicine Department, at Government General Hospital attached to Government Medical College, Nizamabad. This study was a hospital based cross-sectional study. Study was conducted for 1 year from April 2017 to April 2018. A convenient sample of 100 patients was taken in this study after applying inclusion and exclusion criteria. Patients who fulfilled the criteria for metabolic syndrome by IDF were included in the study after taking written informed consent.

### RESULTS

In this study total 100 patients were included, 43 were males and 57 were females. Majority of patients 45 were in the 40 to 49 age group. 80 patients found to be euthyroid and 20 patients were with thyroid dysfunction. 4 patients were hypothyroid. 14 patients had Subclinical hypothyroidism and 2 patients had Subclinical hyperthyroidism.

### CONCLUSIONS

In this study 100 patients were included, 43 were males and 57 were females. Majority of patients (45) were in the 40 to 49 years age group. According to American Thyroid Association and The Endocrine Society classification 80 patients were found to be euthyroid and 20 patients were with thyroid dysfunction. 4 patients were hypothyroid. 14 patients had subclinical hypothyroidism and 2 patients had subclinical hyperthyroidism in the present study.

### KEYWORDS

Metabolic Syndrome, Thyroid Dysfunction, Subclinical Hypothyroidism, IDF Criteria, Thyroid Profile

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## BACKGROUND

Metabolic Syndrome (MS) is a cluster of metabolic abnormalities wherein people are obese and have hypertension, high triglyceride level, low high density lipoprotein and abnormal fasting glucose levels.<sup>1,2</sup> It is also known as Syndrome X. Metabolic syndrome is associated with the risk of developing cardiovascular disease and type 2 diabetes.<sup>3,4</sup> Thyroid dysfunction, prominently subclinical hypothyroidism has been observed more frequently in metabolic syndrome patients than general population.<sup>5</sup> Both metabolic syndrome and hypothyroidism are independent risk factors for cardiovascular diseases (CVD). Presence of both conditions may be compounded to increase the risk for CVD and a considerable overlap occurs in the pathogenic mechanisms of atherosclerotic cardiovascular disease by metabolic syndrome and hypothyroidism.<sup>6</sup>

Thyroid dysfunction, prominently subclinical hypothyroidism has been observed more frequently in metabolic syndrome patients than general population. The concomitant presence of thyroid dysfunction and diabetes mellitus may be due to an overlap between autoimmune syndromes exemplified in polyglandular autoimmune syndrome type 2, where type 1 diabetes mellitus and Hashimoto's disease are among the most frequently observed complications. The focus of the present review is to summarize the impact of hypothyroidism and hyperthyroidism on the individual components of the metabolic syndrome. There are reports about higher thyroid stimulating hormone (TSH) level in metabolic syndrome patients than in healthy ones, and high prevalence of metabolic syndrome in subjects with TSH level higher than normal as compared to those with normal TSH level.<sup>7,8</sup> However the association between thyroid dysfunction and components of metabolic syndrome is still debatable.<sup>9</sup>

We wanted to study thyroid functions in newly diagnosed metabolic syndrome patients.

## METHODS

The study was conducted among the outpatients attending the General Medicine Department at Government General Hospital, attached to Government Medical College, Nizamabad. This study was hospital based cross-sectional study. Study was conducted for 1 year from April 2017 to April 2018. A convenient sample of 100 patients was taken in this study after applying inclusion and exclusion criteria. The patients who fulfilled the criteria for metabolic syndrome by IDF were included in the study after taking written informed consent. From all participants, detailed history of diseases, medication and anthropometric measurements like height, weight and waist circumference were taken in pretested questionnaire. Blood pressure was recorded. Blood tests like fasting blood sugar, lipid profile and thyroid assay were done after eight hours of fasting. Data was collected and analysed.

## Inclusion Criteria

Newly diagnosed metabolic syndrome patients

## Exclusion Criteria

1. Known Hypothyroid/Sub-clinical Hypothyroid.
2. Taking medications for DM/SHT/Thyroid Disorder.
3. Taking steroids.
4. Severely ill patients.
5. Pregnant women.
6. Individuals below 18 yrs.

## IDF 2005 Criteria for Metabolic Syndrome<sup>10</sup>

The International Diabetes Federation included waist circumference which was ethnicity specific (South Asian) measured midway between the uppermost border of the iliac crest and lower most border of the lower border of the costal margin for men with a circumference more than 90 cm and for women, more than 80 cm.

Plus any two of the below mentioned criteria;

1. TGL (Triglycerides)- more than 150 mg/dl
2. HDL (High Density Cholesterol)- less than 40 mg/dl in men, 50 mg/dl in women
3. BP (Blood pressure)- Systolic more than 130 mmHg. Diastolic more than 85 mmHg
4. FBS (Fasting Blood Sugar)- more than 100 mg/dl

Thyroid function tests were done by Chemiluminescent Immunoassay (CLIA) method. Glucose and lipid analyses were carried on automated clinical chemistry analysers. Serum glucose was measured by, GOD-POD (Glucose oxidase-peroxidase) end point Trinder's method. Total cholesterol was measured using the cholesterol oxidase test. Triglycerides were measured using the enzymatic method. HDL and LDL cholesterol were measured using the direct homogenous method. As per the joint statement from the American Association of Clinical Endocrinologists, the American Thyroid Association and The Endocrine Society<sup>11</sup>, TSH and FT4 levels are as follows- in euthyroidism (TSH - 0.4 mU/L to 4.5 mU/L, FT4 - 0.70 ng/dL to 1.80 ng/dL; in sub-clinical hypothyroidism (TSH - 4.51 mU/L to 10.0 mU/L, FT4 - 0.70 ng/dL to 1.80 ng/dL), hypothyroidism (TSH - > 10.0 mU/L, FT4 - < 0.70 ng/dL), sub-clinical hyperthyroidism (TSH - 0.1 mU/L to 0.4 mU/L, FT4 - 0.70 ng/dL to 1.80 ng/dL) and in hyperthyroidism (TSH - < 0.1 mU/L, FT4 - > 1.80 ng/dL).

## RESULTS

Age Group	Males	Female	Total
18-29	0	1	1
30-39	10	17	27
40-49	20	25	45
50-59	9	11	20
60-69	4	3	7
Total	43	57	100

**Table 1. Age and Sex Wise Distribution of Study Population**

In this study total 100 patients were included, 43 were males and 57 were females. Majority of patients 45 were in the 40 to 49 age group.

Thyroid Profile	Males	Females	Total
Euthyroidism	37	43	80
Hypothyroidism	2	2	4
Subclinical hypothyroidism	4	10	14
Subclinical hyperthyroidism	0	2	2
Hyperthyroidism	0	0	0
Total	43	57	100

**Table 2. Sex wise Prevalence of Thyroid Dysfunction in the Study Population**

In this present study According to American Thyroid Association and The Endocrine Society classification 80 patients found to be euthyroid and 20 patients were with thyroid dysfunction. 4 patients were hypothyroid. 14 patients had Subclinical hypothyroidism and 2 patients had Subclinical hyperthyroidism.

Thyroid Profile	18-29	30-39	40-49	50-59	60-69	Total
Euthyroidism	1	23	33	16	7	80
Hypothyroidism	0	3	0	1	0	4
Subclinical hypothyroidism	0	1	10	3	0	14
Subclinical hyperthyroidism	0	0	2	0	0	2
Hyperthyroidism	0	0	0	0	0	0
Total	1	27	45	20	7	100

**Table 3. Age Wise Prevalence of Thyroid Dysfunction in the Study Population**

In the present study majority 33 patients with Euthyroidism was in the age group of 40 to 49 followed by 30 to 39 and 5 to 59 age group. Majority 1 patients with Subclinical hypothyroidism were in 40 to 49 years age group. Thyroid dysfunction was seen in 20 patients and 80 patients were in Euthyroid state.

Thyroid Profile	3	4	5	Total
Euthyroidism	23	25	32	80
Hypothyroidism	2	0	2	4
Subclinical hypothyroidism	3	2	9	14
Subclinical hyperthyroidism	0	2	0	2
Hyperthyroidism	0	0	0	0
Total	28	29	43	100

**Table 4. Metabolic Syndrome Criteria Wise Distribution of Thyroid Dysfunction**

In the present study Based on IDF criteria patients with three of five risk factors 5 have thyroid dysfunction, patients with four of five risk factors four have thyroid dysfunction, patients with five of five risk factors 11 have thyroid dysfunction.

**DISCUSSION**

In this study total 100 patients were included, 43 were males and 57 were females. Metabolic syndrome was majority (45) in the 40 to 49 age group. Thyroid dysfunction was seen in 20 patients and 80 patients were in Euthyroid state. According to Hollowell JG, Staehling NW, Flanders WD, Hannon WH et al<sup>12</sup> thyroid dysfunction was 5.9%, hypothyroidism was 4.6%, subclinical hypothyroidism was 4.6% these results was lesser than present study. According

to Uzunlulu M, Yorulmaz E, Oguz A et al<sup>13</sup> 16% of metabolic syndrome patens had hypothyroidism these results are near to present study. Based on IDF criteria patients with three of five risk factors 5 have thyroid dysfunction, patients with four of five risk factors four have thyroid dysfunction, patients with five of five risk factors 11 have thyroid dysfunction.

**CONCLUSIONS**

In this study 100 patients were included; 43 were male and 57 were female. Majority of patients (45) were in the 40-49 years age group. According to American Thyroid Association and The Endocrine Society classification 80 patients were found to be euthyroid and 20 patients were with thyroid dysfunction. 4 patients were hypothyroid. 14 patients had subclinical hypothyroidism, and 2 patients had subclinical hyperthyroidism in the present study. In the present study majority (33 patients) with euthyroidism was in the age group of 40-49 years, followed by 30-39 years and 50-59 years age group. Majority patients with subclinical hypothyroidism were in 40 to 49 years age group. Thyroid dysfunction was seen in 20 patients and 80 patients were in euthyroid state. Based on IDF criteria patients with three of five risk factors, 5 have thyroid dysfunction, patients with four of five risk factors, four have thyroid dysfunction, patients with five of five risk factors (11) have thyroid dysfunction.

This study shows that prevalence of thyroid dysfunction in metabolic syndrome patients was higher than in normal population.

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